

SPECIFICATION AMENDMENTS

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On page 1, insert above line 1, insert--Priority Claim

The present application claims priority on European Patent Application 02016087.5 filed 19 July 2002.--

On page 1, above line 1, insert--Field of the Invention--

Paragraph at line 1 of page 1 has been amended as follows:

-- The invention is directed related to a composition comprising an ethylene-propylene-diene (EPDM) rubber component and a paraffinic oil component.--

On page 1, above line 4, insert--Background of the Invention--

Paragraph at line 4 of page 1 has been amended as follows:

-- Such a-EPDM containing compositions are well known and are described in detail in Rubber Technology Handbook, Werner Hofmann, Oxford University Press, New York, 1980, paragraph 3.3.8, pages 93-100. Paraffinic oils are used as plasticisers or softening agents in such compositions. Also compositions often referred to as thermoplastic elastomers (TPE) or also sometimes referred to as thermoplastic vulcanisates (TPV) as described in said Handbook on pages 144 - 150 and 154 - 156 comprising EPDM and a polypropylene may comprise paraffinic process oils. Examples of such compositions may be found in EP-A-1132242, GB-A-155020, US-A-Pat No.5290886 and EP-A-1028145.--

Paragraph at line 24 of page 1 has been amended as follows:

-- US-A-Pat No.4208310 and US-A-Pat No.4134870 describe an elastomer composition containing a paraffinic wax, which according to the description may be a Fischer-Tropsch derived wax. The addition of the wax, which is solid at room temperature, results is improved physical and rheological properties. EP-A-577255 describes an EPDM composition which contains an extender oil and a crystalline paraffin wax. The crystalline

wax may be prepared by a Fischer-Tropsch process. The paraffinic wax has a melting point of between 60 and 100 °C and is thus solid at room temperature.--

On page 2, above line 14, insert--Summary of the Invention--

Paragraph at line 14 of page 2 has been amended as follows:

-- ~~The object of this invention is to provide an EPDM containing composition having a low hydrocarbon emission. - The invention is directed to a composition comprising an ethylene-propylene-diene rubber component; and, a process oil having a kinematic viscosity at 100 °C greater than 8 cSt and a pour point of below 10 °C wherein the process oil is obtained by a process comprising:~~

(a) hydrocracking / hydroisomerizing a feed comprising a Fischer-Tropsch synthesis product;

(b) isolating from the product of step (a) a process oil precursor fraction; and,

(c) dewaxing the process oil precursor fraction obtained in step (b) to obtain the process oil.--

On page 2, delete line 14-26.

On page 2, above line 27, insert--Detailed Description of the Invention--

Paragraph at line 27 of page 2, ending at line 5 of page 3, has been amended as follows:

-- Applicants have found that a process oil as derived from a Fischer-Tropsch synthesis product can be simply obtained having properties which lower the hydrocarbon emissions of the finished EPDM comprising product. Some severely hydroprocessed or synthetic paraffinic process oils as described above may hydroprocessed oils is that the low temperature properties for the higher viscosity grade oils is much better making the Fischer-Tropsch derived oils ~~more easy~~ easier to handle in the process ~~to make of making~~ the EDPM containing product.--

Paragraph at line 14 of page 3 has been amended as follows:

--The kinematic viscosity at 100 °C of the oil will be ~~resultant~~ from the above requirements and will usually be above 8 cSt and ~~more~~ preferably above 9 cSt. The upper limit is not essential for the hydrocarbon emissions requirements. Nevertheless it is not

advantageous to use oil that is too viscous ~~oil~~ for practical processing reasons. Preferably the upper limit will be around 30 cSt, preferably 25 cSt. The pour point of the process oil will be dependent on the viscosity grade used. Applicants have found a process involving a catalytic dewaxing step to prepare a Fischer-Tropsch process oil having pour points ranging from – 40 °C for the less viscous grades to around 10 °C for the more viscous grades. This has been found very advantageous because the oil can be used in a liquid state at ambient conditions during the manufacturing of the EPDM comprising composition. Applicants further found that the Fischer-Tropsch derived oil preferably has a CN number as measured according to IEC 590 of between 15 and 30%.--

Paragraph at line 1 of page 4 has been amended as follows:

- The process oil is ~~preferably~~ prepared using the below process, by
- (a) hydrocracking/~~hydroisomerising~~ hydroisomerizing a feed comprising a Fischer-Tropsch derived feed; ;
 - (b) isolating from the product of step (a) a process oil precursor fraction; ; and
 - (c) dewaxing the process oil precursor fraction obtained in step (b) to obtain the process oil, optionally after separating a lower boiling fraction from said dewaxed product.--

Paragraph at line 11 of page 4 has been amended:

-- The Fischer-Tropsch derived feed can be obtained by well-known processes, for example the so-called commercial Sasol process, the commercial Shell Middle Distillate Process or by the non-commercial Exxon process. These and other processes are for example described in more detail in EP-A-776959, EP-A-668342, US-A-Pat No.4943672, US-A-Pat No.5059299, WO-A-9934917 and WO-A-9920720 all of which are hereby incorporated by reference.--

Paragraph at line 19 of page 4 has been amended as follows:

-- A preferred process to prepare the process oil having the desired flash point, evaporation loss and CN-number properties involves using a Fischer-Tropsch derived feed in step (a) ~~which is characterized in that~~ wherein the weight ratio of compounds having at least 60 or more carbon atoms and compounds having at least 30 carbon atoms in the Fischer-Tropsch derived feed is at least 0.2 and wherein at least 30 wt% of compounds in

the Fischer-Tropsch product have at least 30 carbon atoms. More preferably, the feed has at least 50 wt% and most preferably at least 55 wt% of compounds having at least 30 carbon atoms. Furthermore, the weight ratio of compounds having at least 60 or more carbon atoms and compounds having at least 30 carbon atoms of the Fischer-Tropsch derived feed is preferably at least 0.4 and more preferably at least 0.55. The Fischer-Tropsch derived feed is preferably derived from a Fischer-Tropsch product which comprises a C₂₀+ fraction having an ASF-alpha value (Anderson-Schulz-Flory chain growth factor) of at least 0.925, preferably at least 0.935, more preferably at least 0.945, even more preferably at least 0.955.--

Paragraph at line 8 of page 5 has been amended as follows:

-- The initial boiling point of the Fischer-Tropsch derived feed may range up to 400 °C, but is preferably below 200 °C. Preferably at least any compounds having 4 or less carbon atoms and any compounds having a boiling point in that range are separated from a Fischer-Tropsch synthesis product before the Fischer-Tropsch synthesis product is used as a Fischer-Tropsch derived feed in step (a). In addition to this Fischer-Tropsch product also other fractions may also be part of the Fischer-Tropsch derived feed. Possible other fractions may suitably be any high boiling fraction obtained in step (b).--

Paragraph at line 20 of page 5 has been amended as follows:

-- Such a Fischer-Tropsch derived feed is suitably obtained by a Fischer-Tropsch process, which yields a relatively heavy Fischer-Tropsch product. Not all Fischer-Tropsch processes yield such a heavy product. An example of a suitable Fischer-Tropsch process is described in WO-A-9934917 and in AU-A-698392 hereby incorporated by reference. These processes may yield a Fischer-Tropsch product as described above.--

Paragraph at line 28 of page 5 has been amended as follows:

-- The Fischer-Tropsch derived feed and the resulting waxy raffinate product will contain no or very little ~~sulphur~~ sulfur and nitrogen containing compounds. This is typical for a product derived from a Fischer-Tropsch reaction, which uses synthesis gas containing almost no impurities. ~~Sulphur~~ Sulfur and nitrogen levels will generally be below the detection limits, which are currently 5 ppm for ~~sulphur~~ sulfur and 1 ppm for nitrogen.--

Paragraph at line 18 of page 6 has been amended as follows:

-- The hydrocracking/~~hydroisomerisation~~ hydroisomerization reaction of step (a) is preferably performed in the presence of hydrogen and a catalyst, which catalyst can be chosen from those known to one skilled in the art as being suitable for this reaction. Catalysts for use in step (a) typically comprise an acidic functionality and a hydrogenation/dehydrogenation functionality. Preferred acidic functionalities are refractory metal oxide carriers. Suitable carrier materials include silica, alumina, silica-alumina, zirconia, titania and mixtures thereof. Preferred carrier materials for inclusion in the catalyst for use in the process of this invention are silica, alumina and silica-alumina. A particularly preferred catalyst comprises platinum supported on a silica-alumina carrier. If desired, the acidity of the catalyst carrier may be enhanced by applying a halogen moiety, in particular fluorine, or a phosphorous moiety to the carrier. Examples of suitable hydrocracking/~~hydroisomerisation~~ hydroisomerization processes and suitable catalysts are described in WO-A-0014179, EP-A-532118 and the earlier referred to EP-A-776959 all of which are hereby incorporated by reference. --

Paragraph at line 6 of page 7 has been amended as follows:

-- Preferred hydrogenation/dehydrogenation functionalities are Group VIII metals, such as a nickel, cobalt, iron, palladium and platinum. Preferred are the noble metal Group VIII members, palladium and more preferred platinum. The catalyst may comprise the more preferred noble metal hydrogenation/dehydrogenation active component in an amount of from 0.005 to 5 parts by weight, preferably from 0.02 to 2 parts by weight, per 100 parts by weight of carrier material. A particularly preferred catalyst for use in the hydroconversion stage comprises platinum in an amount in the range of from 0.05 to 2 parts by weight, more preferably from 0.1 to 1 parts by weight, per 100 parts by weight of carrier material. The catalyst may also comprise a binder to enhance the strength of the catalyst. The binder can be non-acidic. Examples are clays and other binders known to one skilled in the art.--

Paragraph at line 25 of page 9, ending at line 20 of page 10, has been amended as follows:

-- Preferably step (c) is performed by means of a catalytic dewaxing process. The catalytic dewaxing process can be performed by any process wherein in the presence of a catalyst and hydrogen the pour point of the process oil precursor fraction is reduced as specified above. Suitable dewaxing catalysts are heterogeneous catalysts comprising a

molecular sieve and optionally in combination with a metal having a hydrogenation function, such as the Group VIII metals. Molecular sieves, and more suitably intermediate pore size zeolites, have shown a good catalytic ability to reduce the pour point of the process oil precursor fraction under catalytic dewaxing conditions. Preferably the intermediate pore size zeolites have a pore diameter of between 0.35 and 0.8 nm. Suitable intermediate pore size zeolites are mordenite, ZSM-5, ZSM-12, ZSM-22, ZSM-23, SSZ-32, ZSM-35 and ZSM-48. Another preferred group of molecular sieves are the silica-aluminaphosphate (SAPO) materials of which SAPO-11 is most preferred as for example described in US-A-Pat No. 4859311. ZSM-5 may optionally be used in its HZSM-5 form in the absence of any Group VIII metal. The other molecular sieves are preferably used in combination with an added Group VIII metal. Suitable Group VIII metals are nickel, cobalt, platinum and palladium. Examples of possible combinations are Ni/ZSM-5, Pt/ZSM-23, Pd/ZSM-23, Pt/ZSM-48 and Pt/SAPO-11. Further details and examples of suitable molecular sieves and dewaxing conditions are for example described in WO-A-9718278, US-A-Pat No. 5053373, US-A-Pat No. 5252527 and US-A-Pat No. 4574043 all of which are hereby incorporated by reference.--

Paragraph at line 6 of page 11 has been amended as follows:

-- A preferred class of dewaxing catalysts comprise intermediate zeolite crystallites as described above and a low acidity refractory oxide binder material which is essentially free of alumina as described above, wherein the surface of the aluminosilicate zeolite crystallites has been modified by subjecting the aluminosilicate zeolite crystallites to a surface dealumination treatment. A preferred dealumination treatment is by contacting an extrudate of the binder and the zeolite with an aqueous solution of a fluorosilicate salt as described in for example US-A-Pat No 5157191 or WO-A-0029511. Examples of suitable dewaxing catalysts as described above are silica bound and dealuminated Pt/ZSM-5, silica bound and dealuminated Pt/ZSM-23, silica bound and dealuminated Pt/ZSM-12, silica bound and dealuminated Pt/ZSM-22, as for example described in WO-A-0029511 and EP-B-832171.--

Paragraph at line 23 of page 11, ending at line 3 of page 12, has been amended as follows:

-- Catalytic dewaxing conditions are known in the art and typically involve operating temperatures in the range of from 200 °C to 500 °C, suitably from 250 °C to

400 °C, hydrogen pressures in the range of from 10 bar to 200 bar, preferably from 40 bar to 70 bar, weight hourly space velocities (WHSV) in the range of from 0.1 to 10 kg of oil per litre of catalyst per hour (kg/l/hr), suitably from 0.2 to 5 kg/l/hr, more suitably from 0.5 to 3 kg/l/hr and hydrogen to oil ratios in the range of from 100 to 2,000 litres of hydrogen per litre of oil. By varying the temperature between 315 °C and 375 °C at between 40-70 bars, in the catalytic dewaxing step it is possible to prepare base oils having different pour point specifications varying from suitably -10 °C o -60 °C.--

Paragraph at line 4 of page 12 has been amended as follows:

-- Optionally a lower boiling fraction is separated from the oil as obtained after dewaxing. The need to separate a fraction will be determined by the properties of the process oil precursor fraction used in step (c) and the dewaxing process used. For example, a catalytic dewaxing step will suitably require such a separation because lower boiling fractions are formed in the dewaxing process, which need to be removed in order to achieve the volatility requirements of the process oil used in the present invention.--

Paragraph at line 14 of page 12 has been amended as follows:

-- The process oil may be subjected to a hydrofinishing step or an adsorption step in order to improve its ~~colour~~ color properties. Adsorption may be performed by contacting the oil with a suitable heterogeneous adsorbents, for example active carbon, zeolites, for example natural faujasite, or synthetic materials such as ferrierite, ZSM-5, faujasite, mordenite, metal oxides such as silica powder, silica gel, aluminium oxyde and various clays, for example Attapulugus clay (hydrous magnesium-aluminium silicate), Porocel clay (hydrated aluminium oxide). A preferred adsorbent is activated carbon.--

Paragraph at line 25 of page 12 has been amended as follows:

-- A hydrofinishing step is suitably carried out at a temperature between 180 °C and 380 °C, a total pressure of between 10 bar to 250 bar and preferably above 100 bar and more preferably between 120 bar and 250 bar. The WHSV (Weight hourly space velocity) ranges from 0.3 to 2 kg of oil per litre of catalyst per hour (kg/l.h).--

Paragraph at line 27 of page 13, ending at line 2 of page 14 has been amended as follows:

-- The content of the Fischer-Tropsch derived paraffinic process oil in the composition according to the present invention will depend on the desired properties of the end product and on the other components of the composition. The oil is usually applied as platiciser-plasticizer. Typical ranges are mentioned in the above referred to patent applications. Typically the content of the paraffinic process oil may be between 1 and 60 wt% of the composition.--

Paragraph at line 10 of page 14 has been amended as follows:

-- The composition may also be a thermoplastic vulcanisate composition comprising an ethylene-propylene-diene rubber component and a poly-olefin component. The poly-alpha olefin is preferably polypropylene. Such compositions ~~combine~~ combines the elastic properties of a rubber with the processing characteristics of a thermoplast. The composition comprises preferably EPDM particles embedded in a polypropylene (PP) matrix. The PP phase presents the processing behaviour of a PP, while the cured EPDM rubber provides excellent elastic properties. The composition may have the same composition as a commercial TPE composition, wherein as the paraffinic oil the Fischer-Tropsch derived process oil is present. Example of commercial thermoplastic vulcanisate are the KELTAN EPDM or SARLINK TPV series from DSM Elastomers. (SARLINK is a trademark)

The below example will illustrate the preparation of a Fischer-Tropsch process oil having the desired properties for use in a composition according to the invention.--

Table 1 on page 17 has been amended as follows:

Table 1

	Process oil-1	Process oil-2
density at 20 °C	837.0	831.5
pour point (°C)	+9	-39
kinematic viscosity at 40 °C (cSt)		56.6
kinematic viscosity at 100 °C (cSt)	22.92	9.1
VI	178	139
sulphur sulfur content (%w)	< 0.001	< 0.001
Flash point (°C) (ISO 2592)	> 300	276

A1)		
Evaporation loss at 107 °C after 22 hours (ASTM D 972)	< 0.05	< 0.05
CN number (IEC 590)	Not measured	18.6

On page 18, above line 1, insert --We claim:--